

## ABSTRACT

**[0066]** Methods and compositions related to the synthesis of photosensitizers of titanium dioxide performed *in situ*, stepwise, in the solid state, and directly on the surface of the titanium dioxide semiconductor material. The method is generally accomplished by first absorbing an anchor ligand onto the titanium dioxide semiconductor material, then adding an appropriate transition metal, and finally adding one or more secondary ligands to complete the synthesis of the transition metal complex or sensitizer.